NAME: DATE:

Unit-2 Mastery Assessment (version 621)

Question 1 (10 points)

Let f represent a function. If $f[35] = 9$, then there exists a knowable solution to the equation below.

$$y = 3 \cdot (f[5x - 50] + 6)$$

Find the solution.

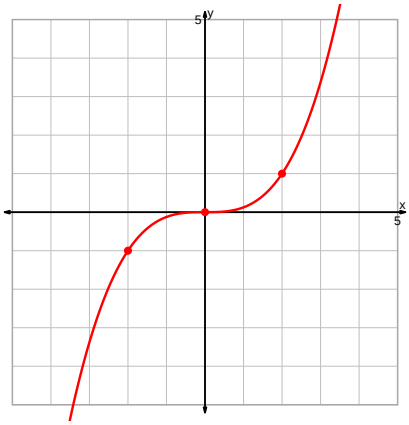
$x = 17$

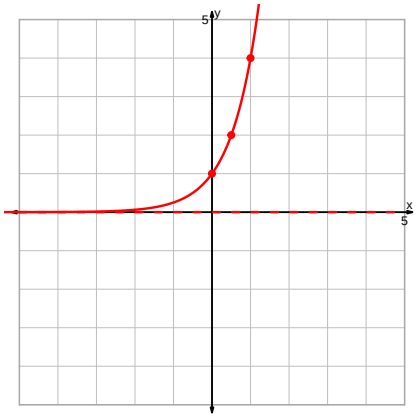
$y = 45$

Question 2 (20 points)

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

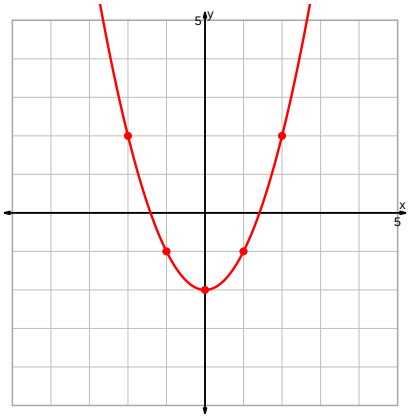
$y = \left(\frac{x}{2}\right)^3$

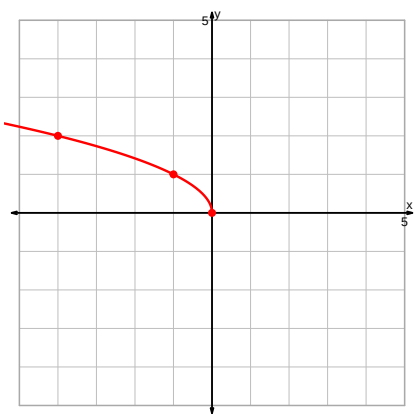




$y = 2^{2x}$

$y = x^2 - 2$

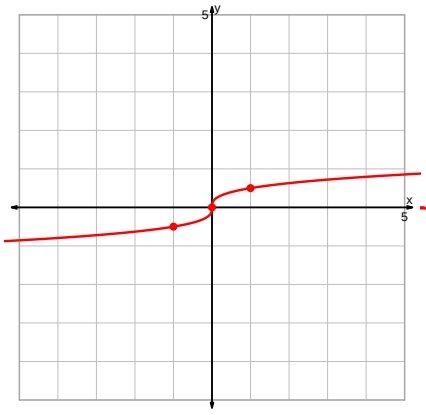


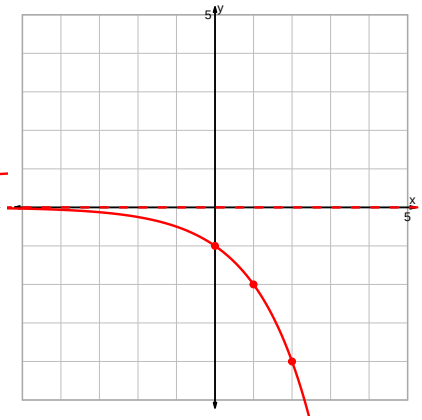


$y = \sqrt{-x}$

Question 2 continued. . .

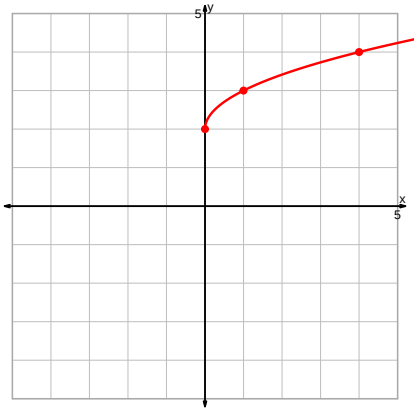
$y = \frac{\sqrt[3]{x}}{2}$

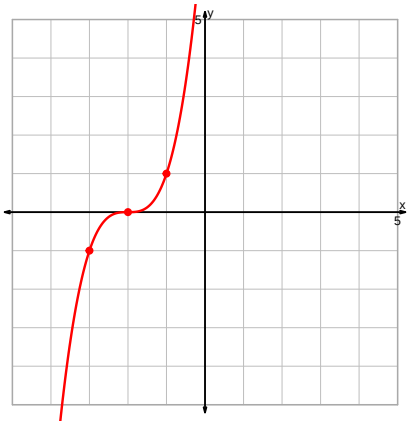




$y = -2^x$

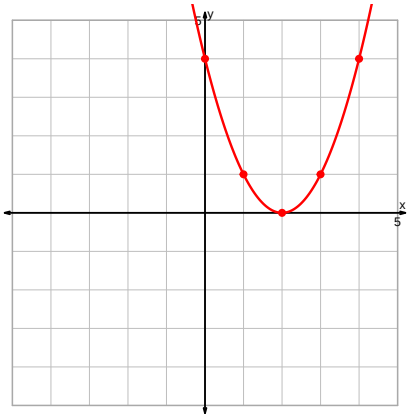
$y = \sqrt{x} + 2$

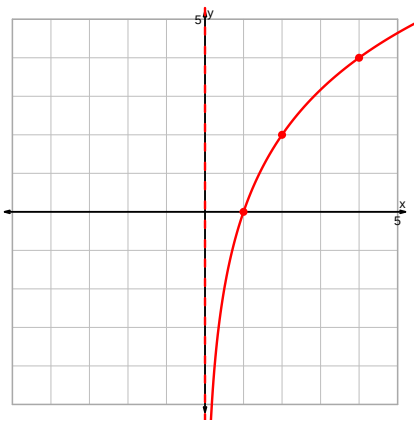




$y = (x+2)^3$

$y = (x-2)^2$

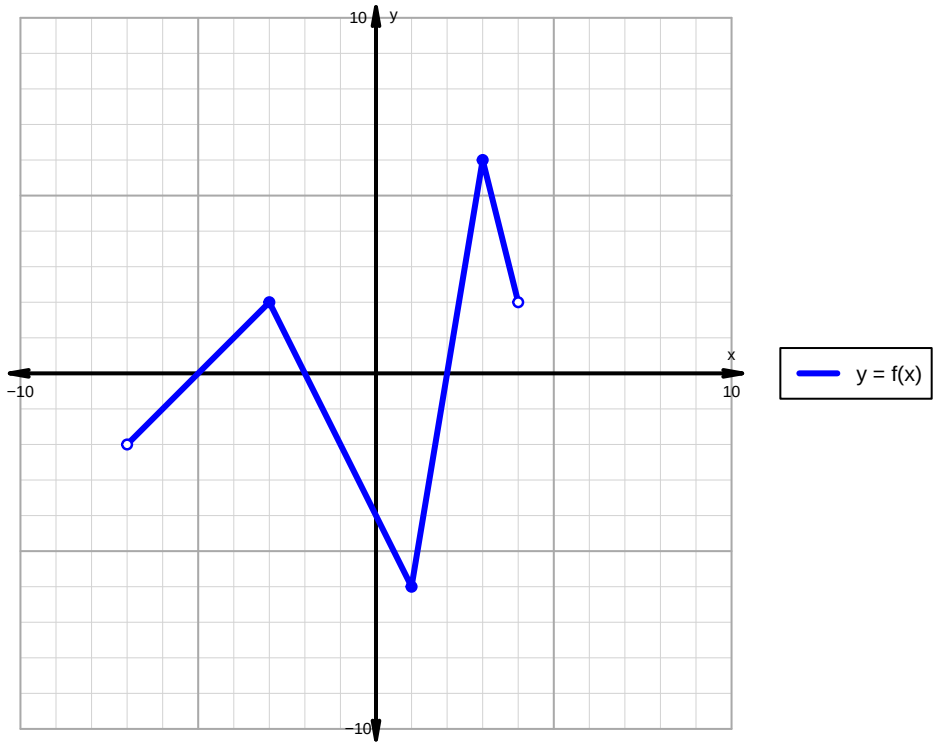




$y = 2 \cdot \log_2(x)$

Question 3 (20 points)

A function is graphed below.



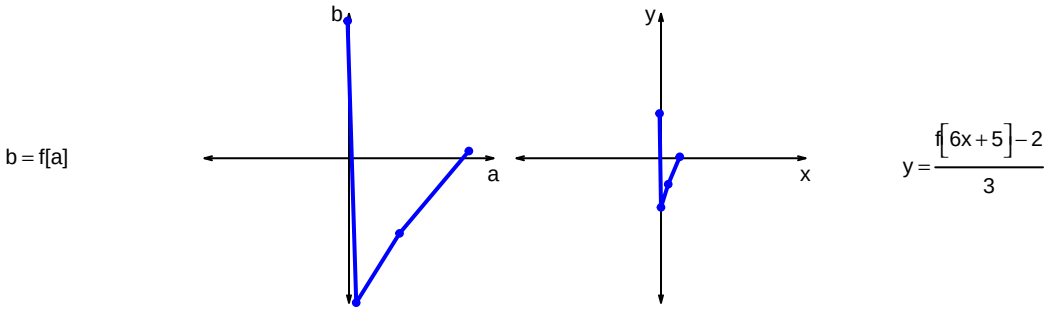
Indicate the following intervals using interval notation.

Feature	Where
Positive	$(-5,-2) \cup (2,4)$
Negative	$(-7,-5) \cup (-2,2)$
Increasing	$(-7,-3) \cup (1,3)$
Decreasing	$(-3,1) \cup (3,4)$
Domain	$(-7,4)$
Range	$(-6,6)$

Question 4 (20 points)

Let f represent a function. The curves $b = f[a]$ and $y = \frac{f[6x+5]-2}{3}$ are represented below in a table and on graphs.

a	b	x	y
-1	95	-1	31
5	-100	0	-34
35	-52	5	-18
83	5	13	1



a. Write formulas for calculating x from a and calculating y from b. (Or, write the coordinate transformation formula.)

$$x = \frac{a-5}{6}$$

$$y = \frac{b-2}{3}$$

Or, you can write the formulas as a coordinate transformation:

$$(a, b) \to \left(\frac{a-5}{6} \ , \ \frac{b-2}{3} \right)$$

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = \frac{f[6x+5]-2}{3}$?

1. Translate left by distance 5.
2. Horizontal shrink by factor 6.
3. Translate down by distance 2.
4. Vertical shrink by factor 3.

Or, technically, the vertical transformations could come first.

1. Translate down by distance 2.
2. Vertical shrink by factor 3.
3. Translate left by distance 5.
4. Horizontal shrink by factor 6.

Question 5 (10 points)

A parent square-root function is transformed in the following ways:

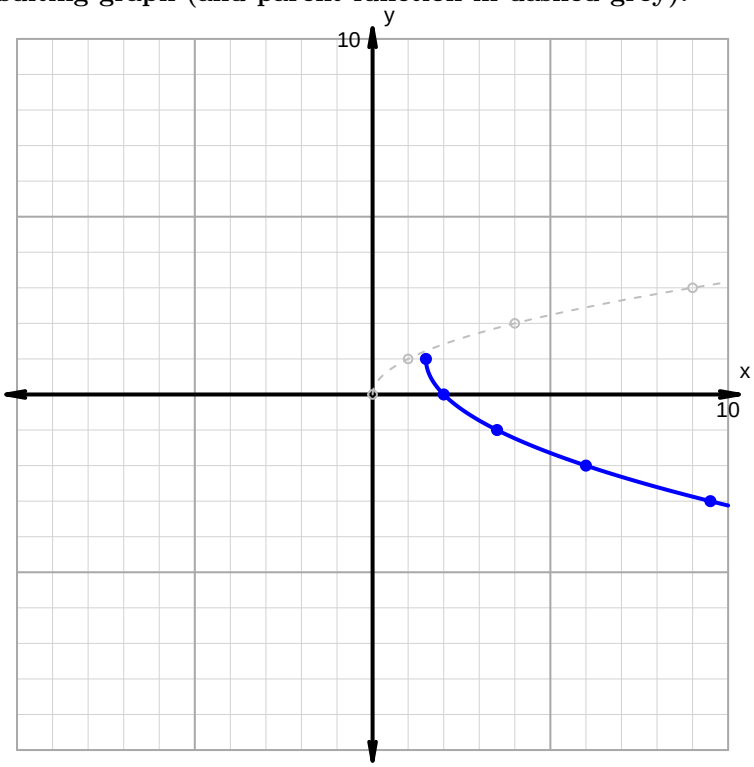
Horizontal transformations

1. Translate right by distance 3.
2. Horizontal shrink by factor 2.

Vertical transformations

1. Translate down by distance 1.
2. Vertical reflection over x axis.

Resulting graph (and parent function in dashed grey):



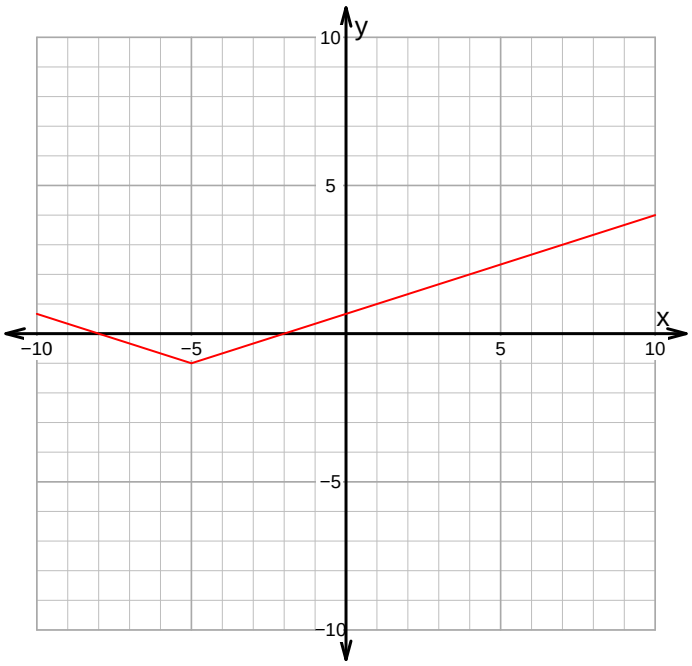
- What is the equation for the curve shown above?

$$y = -\left(\sqrt{2x-3}-1\right)$$

Question 6 (20 points)

Make an accurate graph, and describe locations of features.

$$y = \frac{1}{3} \cdot |x + 5| - 1$$



Feature	Where
Domain	$(-\infty, \infty)$
Range	$[-1, \infty)$
Positive	$(-\infty, -8) \cup (-2, \infty)$
Negative	$(-8, -2)$
Increasing	$(-5, \infty)$
Decreasing	$(-\infty, -5)$